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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/785,002	02/25/2004	Akira Fujibayashi	274.43165X00	9761

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EXAMINER

PATEL, NIKETA I

ART UNIT PAPER NUMBER

2181

DATE MAILED: 03/06/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b> 10/785,002	<b>Applicant(s)</b> FUJIBAYASHI, AKIRA	
	<b>Examiner</b> Niketa I. Patel	<b>Art Unit</b> 2181	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 25 February 2004.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1-28 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-28 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 25 February 2004 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)  | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date <u>8/4/2005</u> . | 6) <input type="checkbox"/> Other: _____  |

## DETAILED ACTION

### *Drawings*

1. Figures 2A-E should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g). Corrected drawings in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

### *Claim Rejections - 35 USC § 102*

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) The invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

3. Claims 1-28 are rejected under 35 U.S.C. 102(e) as being anticipated by Yanai et al. U.S. Patent Application Publication No.: 2004/0073831 A1 (hereinafter "*Yanai*").

4. Referring to claims 1, 10, 15, 24, *Yanai* teaches a method and a storage system for recovering and maintaining data consistency between volumes of first and second storage [see figure 1, elements 14, 46] systems [see paragraph 0011, 0348] which are connected to each other via a path, the first storage [see figure 1, element 14] system being connected to a host [see

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figure 1, element 12], the method comprising the steps of: providing a primary volume [see figure 1, element 20] to the first storage system and a remote secondary volume [see figure 1, element 48] to the second storage system, the remote secondary volume being a copied volume of the primary volume, the primary volume and the remote secondary volume being in synchronous mode [see paragraph 0017, 0106-0111]; providing a local secondary volume in the first storage system [see figure 12, element 291], wherein the local secondary volume has stored therein journal logs of write input/output (I/O) commands [see paragraph 0027] issued by the host to the primary volume to store write data in the primary volume and a base volume including an image of the primary volume at a certain point in time [see paragraph 0027, 0078], wherein the remote secondary volume has stored therein journal logs of write input/output (I/O) commands [see figure 12, element 293] issued by the host to the primary volume and sent to said second storage system to store write data in the remote secondary volume, a base volume including a copied image of the primary volume and a replica base volume including a copy of the base volume [see paragraphs 0015-0018, 0027], and conducting recovery of data on the primary volume from the local secondary volume when necessary by performing recovery of data of the primary volume based on the base volume and the journal logs included in the local secondary volume while maintaining the primary volume and the remote secondary volume in the synchronous mode [see paragraphs 0027, 0182-0185, 0232-0233, 0235, 0238-0239 'recovery'.]

5. Referring to claims 2, 16, Yanai teaches wherein the journal logs are stored in a journal log table [see figure 12, element 293.]

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6. **Referring to claims 3, 17, Yanai** teaches wherein a journal function management table is provided to be accessible and used by said first storage system to manage a process of taking journal logs as represented by said journal log table and a process of recovery of said primary volume to a certain point in time image based on the journal logs [see paragraphs 0027, 'before or after images', 0232-0233.]

7. **Referring to claims 4, 5, 18, Yanai** teaches wherein when said journal function management table is used to manage a process of taking journal logs, said journal log table is referred to obtain information indicating a location where a journal log including said write I/O command and said write data are to be stored and a sequence number for use in identifying said journal log, and said journal log and sequence number are stored in said location indicated by said information [see paragraphs 0027, 0232-0233, 'writes, versions of data written, location, track'.]

8. **Referring to claims 5, 19, Yanai** teaches wherein when said journal function management table is used to manage a process of recovery of said primary volume to a certain point in time image based on the journal logs, said journal log table is referred to sequentially apply the journal logs to the old data according to sequence numbers stored with the journal logs with the result being stored in the primary volume, thereby recovering the primary volume to a certain point in time image [see paragraphs 0027, 0235, 0238-0239.]

9. **Referring to claims 6, 20, Yanai** teaches wherein the recovery of data on the primary volume is performed by applying the journal logs to the old data and storing the result in the primary volume [see paragraphs 0027, 0232-0233, 0235, 0238-0239.]

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10. **Referring to claims 7, 21**, *Yanai* teaches wherein said recovery of the primary volume while maintaining the primal volume and the remote secondary volume in the synchronous mode is conducted by sending the result of applying the journal logs to the old data to the second storage system and storing the result in the remote secondary volume [see paragraphs 0027, 0232-0233, 0235, 0238-0239.]

11. **Referring to claims 8, 22**, *Yanai* teaches wherein each of said first and second storage systems comprises: a storage device having a plurality of disk drives each for storing data [see figure 1, elements 22a, 22b, 22c]; and a storage controller for controlling said storage device [see figure 1, element 16], wherein said storage controller comprises: a front end controller for interfacing with a channel of an external device [see figure 1, element 26], at least one back end controller for interfacing with said storage device [see figure 1, element 30] a shared memory for temporarily storing data including control data transferred between said external device and said storage device [see figure 1, element 28], and an interconnection apparatus for interconnecting said front end controller, said at least one back end controller and said shared memory [see figure 1, elements 32, 38.]

12. **Referring to claims 9, 23**, *Yanai* teaches wherein said primary volume of said first storage system is a logical volume supported by said disk drives included in said storage device, and wherein said local secondary volume of said first storage system is a logical volume supported by said disk drives included in said storage device [see paragraphs 0017, 0021, 0096, 0098, 'logical volume'.]

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13. **Referring to claims 11, 25, Yanai** teaches wherein the recovery of data on the primary volume is performed by applying the journal logs to the base volume and storing the result in the primary volume [see paragraphs 0027, 0232-0233, 0235, 0238-0239.]

14. **Referring to claims 12, 26, Yanai** teaches wherein the recovery of data on the remote secondary volume is performed by applying the journal logs to the replica base volume, and storing the result in the base volume of the remote secondary volume [see paragraphs 0027, 0232-0233, 0235, 0238-0239.]

15. **Referring to claims 13, 27, Yanai** teaches wherein storing the result of applying the journal logs to the base volume in the primary volume includes swapping the base volume for the primary volume [see paragraphs 0027, 0232-0234, 0235, 0238-0239, copying data files.]

16. **Referring to claims 14, 28, Yanai** teaches wherein storing the result of applying the journal logs to the replica base volume in the base volume of the remote secondary volume includes swapping the replica base volume for the base volume [see paragraphs 0027, 0232-0234, 0235, 0238-0239, copying data files.]

### ***Conclusion***

17. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Mirrored storage devices and Systems in which, storage writes are logged in mirrored disk sub-system:

Carteau U.S. Pat. App. Pub. No.: 2002/0083281 A1

Blumenau et al. U.S. Pat. App. Pub. No.: 2004/0080558

Galipeau et al. U.S. Pat. App. Pub. No.: 2002/0049925

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Yanai et al. U.S. Pat. App. Pub. No.: 2006/0005074

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Niketa I. Patel whose telephone number is (571) 272 4156. The examiner can normally be reached on M-F 8:00 A.M. to 5:00 P.M.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kim Huynh can be reached on (571) 272 4147. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

NP  
02/03/2006

  
**KIM HUYNH**  
**SUPERVISORY PATENT EXAMINER**  
2/28/06